# Mechanical Ventilation

## INDICATIONS:

- Respiratory Arrest
- Any Medical Etiology of Dyspnea or Airway Management Intubation
- Any Trauma Etiology of Dyspnea or Airway Management Intubation (except suspected pneumothorax)

## CONTRAINDICATIONS:

- Dyspnea of lesser severity that is able to be managed without mechanical ventilation.
- Active or suspected impending emesis
- Suspected or impending pneumothorax/ tension pneumothorax
- Cardiac arrest **without** an advanced airway established.
- Neonate patients
- Pediatric patients **without** an advanced airway established.

| | | | MALE Vt | FEMALE Vt | MALE Vt | FEMALE Vt |
|---|---|---|---|---|---|---|
| | MALE | FEMALE | COPD/ASTHMA | | ALL OTHER PATIENTS | |
| Height | IBW KG | IBW KG | 6mL/kg | 6 mL/kg | 8 mL/kg | 8 mL/kg |
| 4'6" | 36 | 32 | 217 | 190 | 290 | 254 |
| 4'7" | 39 | 34 | 231 | 204 | 308 | 272 |
| 4'8" | 41 | 36 | 245 | 218 | 326 | 290 |
| 4'9" | 43 | 39 | 259 | 232 | 345 | 309 |
| 4'10" | 45 | 41 | 272 | 245 | 363 | 327 |
| 4'11" | 48 | 43 | 286 | 259 | 382 | 346 |
| 5'0" | 50 | 46 | 300 | 273 | 400 | 364 |
| 5'1" | 52 | 48 | 314 | 287 | 418 | 382 |
| 5'2" | 55 | 50 | 328 | 301 | 437 | 401 |
| 5'3" | 57 | 52 | 341 | 314 | 455 | 419 |
| 5'4" | 59 | 55 | 355 | 328 | 474 | 438 |
| 5'5" | 62 | 57 | 369 | 342 | 492 | 456 |
| 5'6" | 64 | 59 | 383 | 356 | 510 | 474 |
| 5'7" | 66 | 62 | 397 | 370 | 539 | 493 |
| 5'8" | 68 | 64 | 410 | 383 | 547 | 511 |
| 5'9" | 71 | 66 | 424 | 397 | 566 | 530 |
| 5'10" | 73 | 69 | 438 | 411 | 584 | 548 |
| 5'11" | 75 | 71 | 452 | 425 | 602 | 566 |
| 6'0" | 78 | 73 | 466 | 439 | 621 | 585 |
| 6'1" | 80 | 75 | 479 | 452 | 639 | 603 |
| 6'2" | 82 | 78 | 493 | 466 | 658 | 622 |
| 6'3" | 85 | 80 | 507 | 480 | 676 | 640 |
| 6'4" | 87 | 82 | 521 | 494 | 694 | 658 |
| 6'5" | 89 | 85 | 535 | 508 | 713 | 677 |

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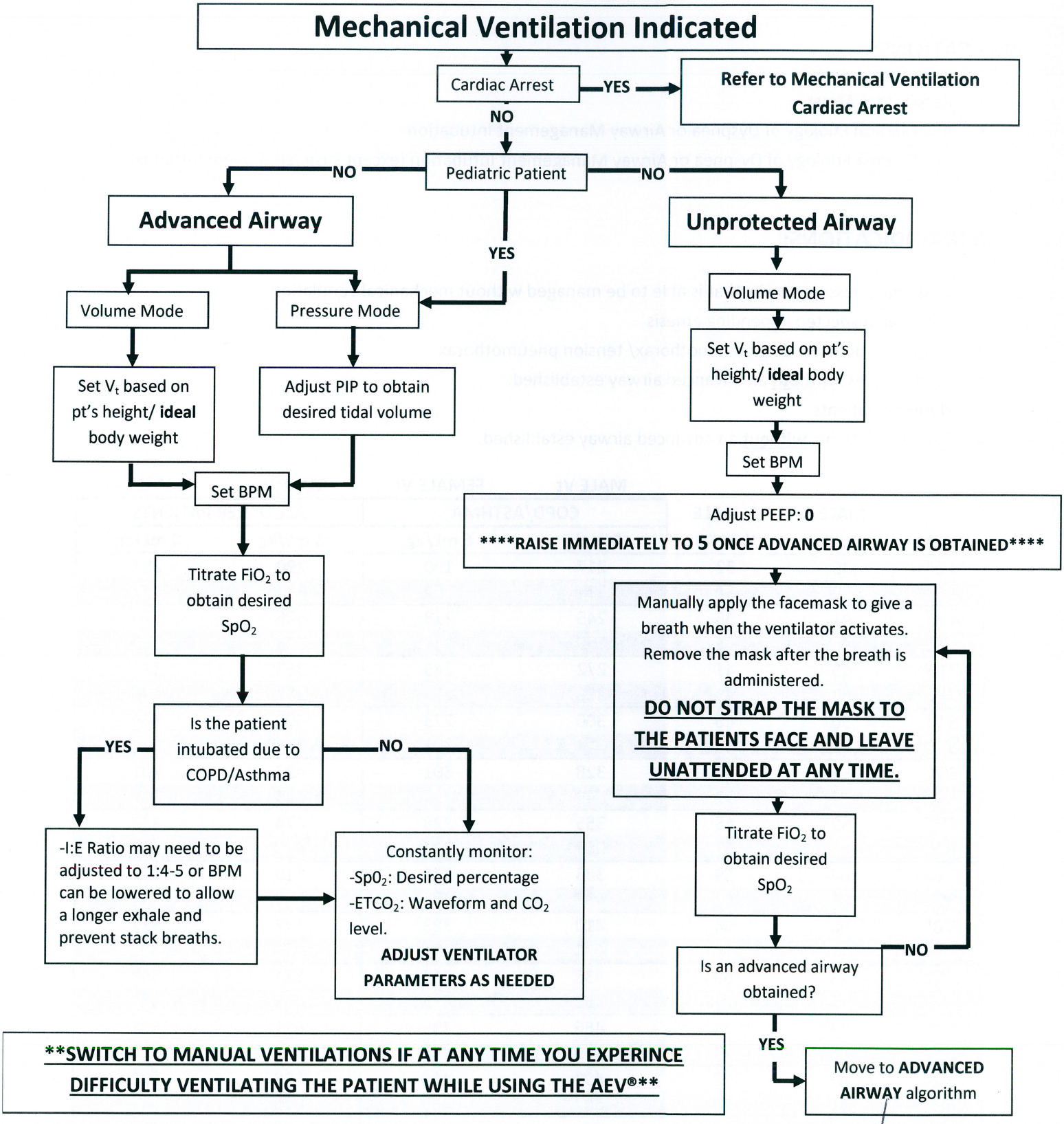
# Mechanical Ventilation Cont'




**SWITCH TO MANUAL VENTILATIONS IF AT ANY TIME YOU EXPERINCE DIFFICULTY VENTILATING THE PATIENT WHILE USING THE AEV®**

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# Mechanical Ventilation Cont'

## Mechanical Ventilation- Cardiac Arrest

Advanced airway established

NO → **VENTILATE WITH BVM**

YES

Pediatric Patient

YES → **VENTILATE WITH BVM**

NO

Volume Mode

Adjust PEEP: **0**

******RAISE IMMEDIATELY TO 5 ONCE ROSC IS OBTAINED********

Adjust $V_t$: **Lower $V_t$ until PIP level maintains < 40 during compressions and adequate chest rise**

******RAISE IMMEDIATELY TO $V_t$ BASED ON PT'S HEIGHT/ IDEAL WEIGHT ONCE ROSC IS OBTAINED********

Adjust PIP High Level Alarm: **40**

Is the cardiac arrest intubated due to COPD/Asthma

YES → -I:E Ratio may need to be adjusted to 1:4-5 or BPM can be lowered to allow a longer exhale and prevent stack breaths.

NO

Constantly monitor:
-$SpO_2$: Desired percentage
-$ETCO_2$: Waveform and $CO_2$ level.
-Adequate chest rise
**ADJUST VENTILATOR PARAMETERS AS NEEDED**

Trigger Level may need to be increased if the CPR is causing erratic ventilation patterns.
**** Return to -2.0 once ROSC is obtained if increased****

**SWITCH TO MANUAL VENTILATIONS IF AT ANY TIME YOU EXPERINCE DIFFICULTY VENTILATING THE PATIENT WHILE USING THE AEV®**

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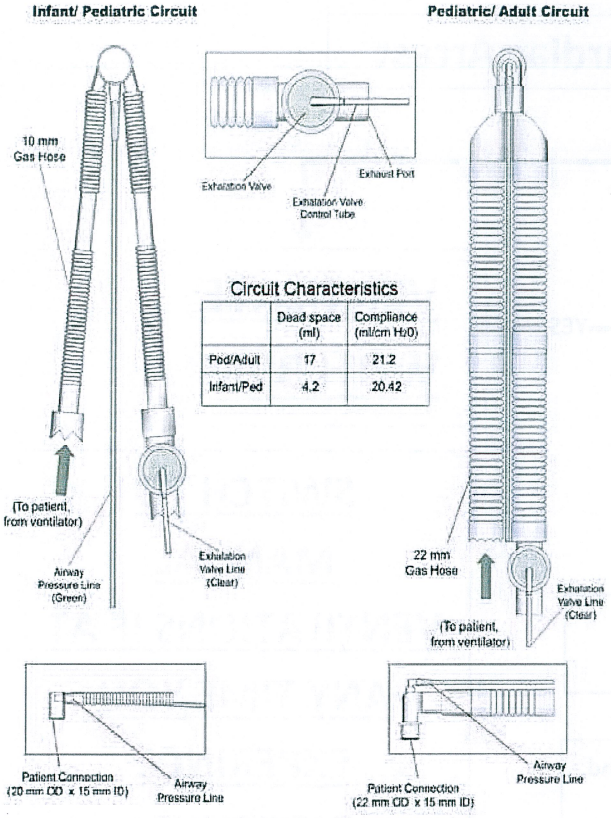
# Mechanical Ventilation Cont'

**Circuits**:

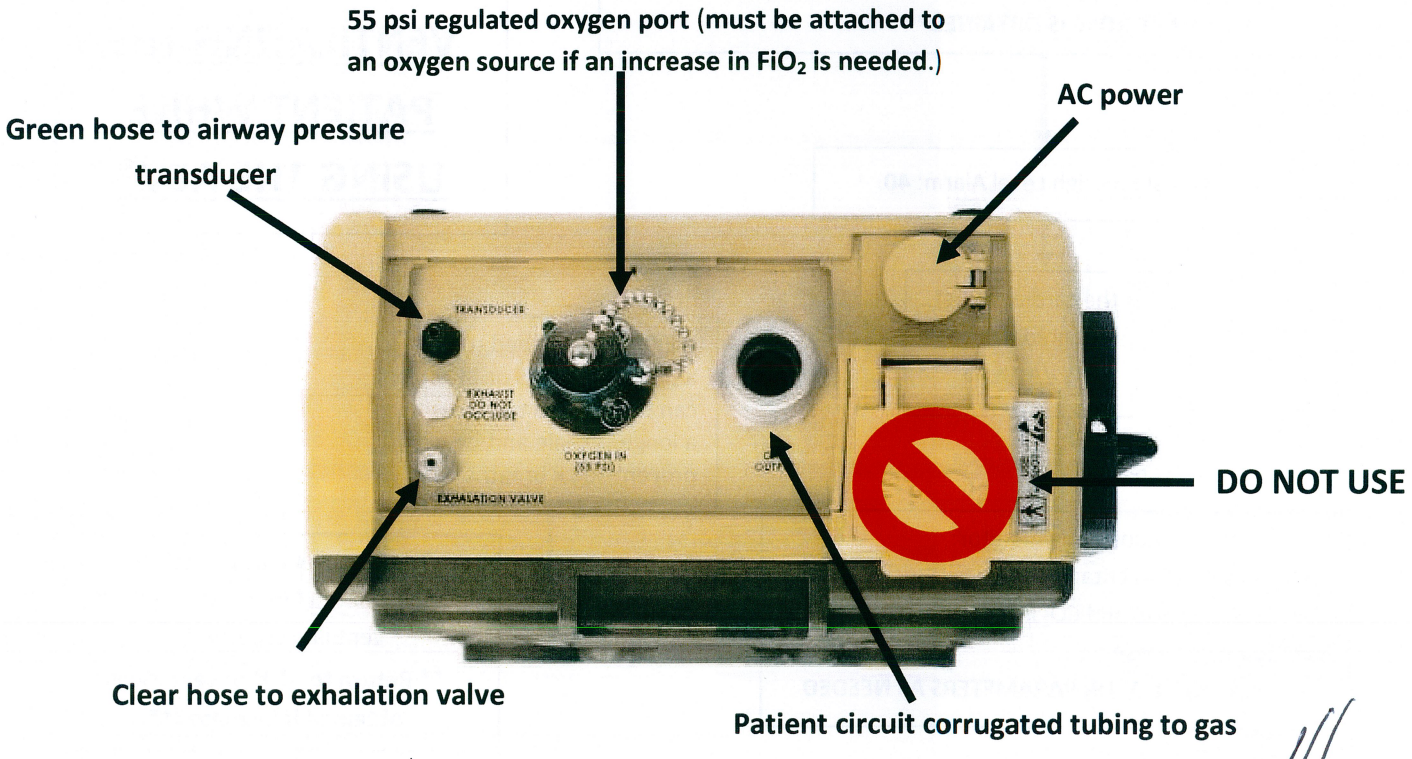



Circuit Characteristics

| | Dead space (ml) | Compliance (ml/cm H2O) |
|---|---|---|
| Ped/Adult | 17 | 21.2 |
| Infant/Ped | 4.2 | 20.42 |

1. AEV® ventilator circuits feature a low dead space design that minimizes $CO_2$ re-breathing.
2. Note: dead space (circuit and HME should never be greater than **25**% of the patient's tidal volume (set or spontaneous).
3. The 2 standard ventilator circuits cover the range of patients from infant to adult.
   - Pediatric/ Adult- patients 20kg through adult, minimum tidal volume 200ml.
   - Infant/pediatric- 5 through 30 kg, maximum tidal volume 300mL.

****DO NOT USE FOR NIPPV****



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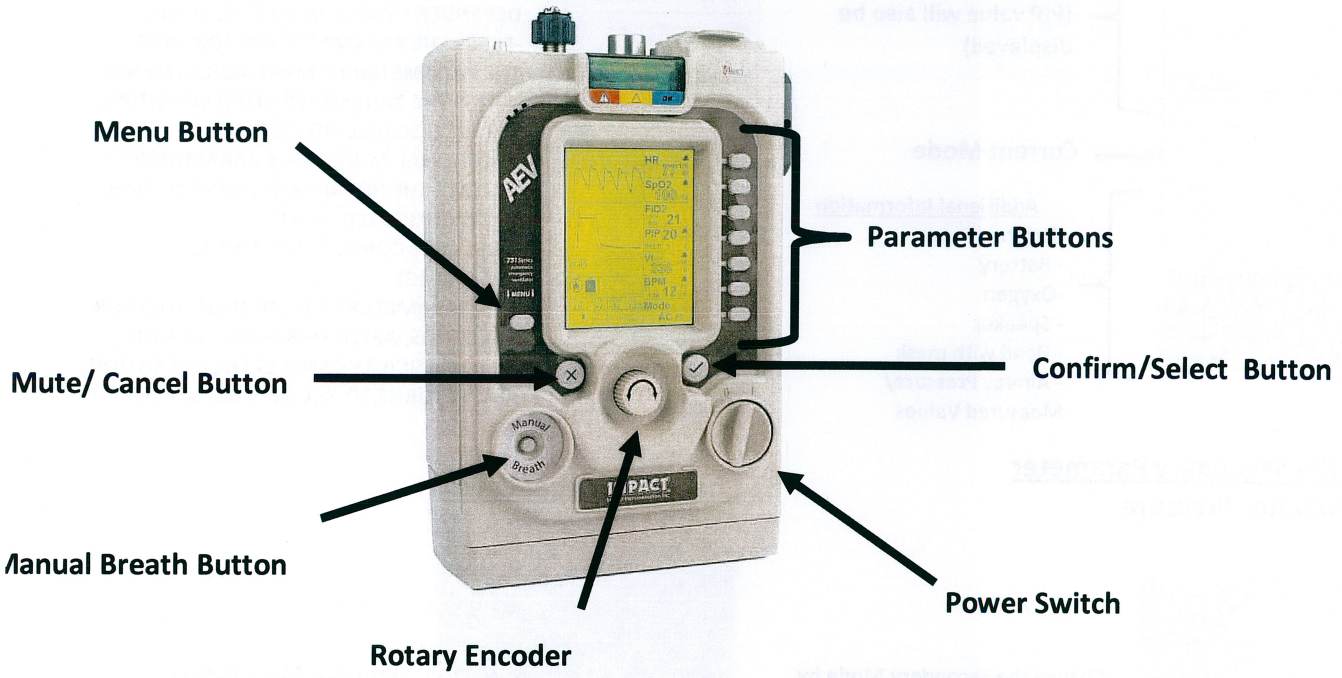
# Mechanical Ventilation Con't




## CHECK THE VENTILATOR CIRCUIT FOR PROPER OPERATION BEFORE CONNECTING TO A PATIENT

**Procedure**:

1. With the breathing circuit connected, turn the **POWER** switch to ON, to allow the ventilator to complete Self Check and begin operation with its default values.
2. The PATIENT DISCONNECT alarm should be active. (The audible alarm will be muted during the 2 minute initial mute.)
3. Press the **MANUAL BREATH** button; gas should flow out of the patient connection each time the button is pressed.

**Note:** The minimum period between manual breaths is limited by the tidal volume and the time required to complete a full exhalation based on the I:E ratio.)

4. Close the patient port with a clean hand or gloved hand. During inspiratory phase, the HIGH AIRWAY PRESSURE LIMIT alarm should activate after 2 breaths that reach the PIP High Limit.
5. If the HIGH AIRWAY PRESSURE LIMIT alarm fails to activate, ensure that all of the tubing connections are secure, the exhalation valve is closing during inhalation, and that the High Airway Pressure Limit is set to 35 cm $H_2O$ or less.
6. After a breath or two, release the patient port while allowing the ventilator to operate. The PATIENT DISCONNECT alarm should activate.
7. Partially close the patient port to reset the PATIENT DISCONNECT alarm. With no other alarms occurring, remove external power from the ventilator. The EXTERNAL POWER LOW/DISCONNECT alarms should activate. Reconnect external power to reset alarms.
8. If the HIGH AIRWAY PRESSURE, PATIENT DISCONNECT, or EXTERNAL POWER LOW/DISCONNECT alarms fail to activate, continue to manually ventilate the patient, replace the ventilator, and send the unit in for service.



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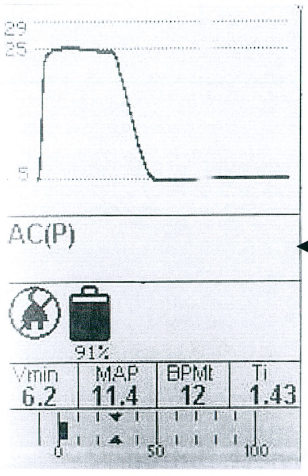
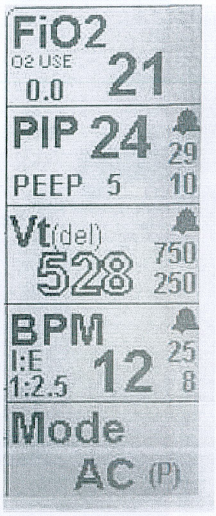
# Mechanical Ventilation Cont'




Breath Waveform (PIP value will also be displayed)

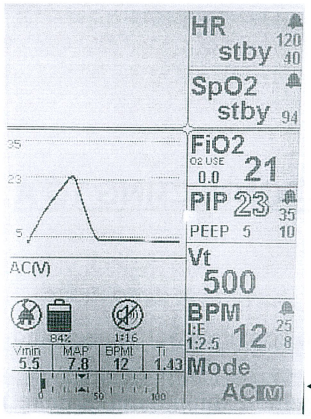
Current Mode

Additional Information
- External Power
- Battery
- Oxygen
- Speaker
- Head with mask
- Airway Pressure/ Measured Values



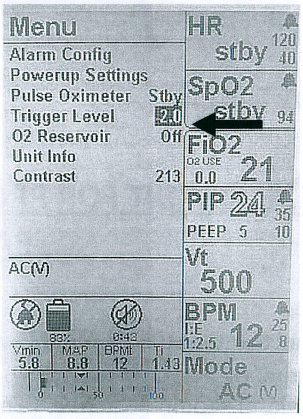

-ANY NUMBER IN BOLD BLACK IS ADJUSTABLE PARAMETER
-ANY NUMBER OUTLINED IS A PATIENT DEPENDENT VALUE (NON ADJUSTABLE)
-PRESS THE PARAMETER BUTTON NEXT TO THE PARAMETER TO MAKE ADJUSTMENTS.
-PRESS THE PARAMETER BUTTON MUTIPLE TIMES TO SCROLL THROUGH THE ADDITIONAL ADJUSTABLE PARAMATERS.
-ROTATE THE ROTARY ENCODER TO CHANGE THE HIGHLIGHTED VALUE.
-PRESS THE CONFIRM BUTTON TO VERIFY THE CHANGE.
** A PARAMETER STAYS HIGHLIGHTED FOR 5 SECONDS; AFTER THIS TIME; THE UNIT AUTOMATICALLY CANCELS THE OPERATIONS AND RETURNS TO THE DEFAULT SCREEN. **

## Changing the Secondary Parameter Volume/ Pressure




-Change the Secondary Mode by pressing the Mode parameter button TWICE
-Turning rotary encoder; choose (P) and press the Confirm button.

## Changing Trigger Level




-Press the Menu button.
-Adjust the Trigger Level with the rotary encoder to desired value.
-Press the Confirm button.

## Safety Notes:

- IBW= Ideal Body Weight
- ↑ $SpO_2$ = Increase PEEP or $FiO_2$
- ↓ $EtCO_2$ = Increase BPM or $V_t$
- **Barotruama is caused by high levels of $T_v$, PIP, or PEEP**
- If problems arise during AEV® use or if there is uncertainty about the adequacy of oxygenation and ventilations with the AEV®, then STOP and ensure oxygenation and ventilation with usual methods.
- Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using a bag- ventilation technique.
- The incidence of a pneumothorax is increased in the presence of chest trauma with any form of positive pressure ventilation.
- Gastric distention can cause resistance to mechanical ventilation. Gastric distention should be suspected in patients with an acutely distended abdomen after non-intubated positive pressure ventilation. Relieve gastric distention impairing respiratory mechanics with either nasogastric or orogastric tub with low suction until distention is relieved.

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